REMARKS

This paper is filed in response to the official action dated December 27, 2007 (the official action). This paper is timely-filed.

By way of this response, claims 1, 7, 10, 17, 23, and 32 have been amended, and claim 12 has been canceled without prejudice or disclaimer. All claim amendments are supported throughout the specification and in the original claims. No new matter has been added.

All pending claims 1, 4, 7, 10, 12-14, 17, 23, 27-28, and 30-33 have been rejected as obvious over U.S. Patent No. 6,518,962 to Kimura et al. ("Kimura") in view of U.S. Patent No. 6,414,661 to Shen et al. ("Shen") alone or further in combination with U.S. Patent No. 6,738,031 to Young et al. ("Young").

AMENDMENTS PROPER FOR ENTRY

The accompanying amendments to claims 1, 7, 10, 17, 23 are proper under 37 C.F.R. §1.116 practice and should be entered because they do not present new issues requiring further search or consideration. The applicants submit that the amendments to these claims are not substantive in nature. In particular, claim 1 now recites that each of the plurality of adjustable constant current generators is for driving a row or column of a display, and that each pixel comprises a pixel driver circuit including a drive field effect transistor. These changes are made to clarify the separation between the pixel driver circuit and the constant current generators driving the display.

Further, the amendments to claim 32 are proper because these amendments place claims 32-33 in a better condition for allowance. Specifically, claim 32 has been amended to explicitly recite, in part, a photodiode coupled across a capacitor to reduce gate connection voltage. These amendments clarify the principle of operation of the display driver being claimed. The applicants note also note that these amendments are consistent with the applicants' statements in Amendment "A" filed in response to the official action from May 14, 2007 (page 9). In particular, the applicants explained therein that claim 32 is directed to a specific type of display in which the gate voltage on the drive transistor of an active matrix pixel decays over time, the rate of decay being determined by a photodiode coupled across a capacitor storing a drive voltage for the display element, the rate of decay being proportional to the pixel brightness. This type of display has to be driven cyclically because of the decay in stored voltage. By way of this

response, the applicants amend claim 32 to explicitly recite these elements, as well as their respective coupling.

CLAIM REJECTIONS – 35 U.S.C. §103(A)

All pending claims were rejected as variously obvious over Kimura, Shen, and Young. The applicants respectfully traverse the rejections at least because the cited references fail to teach or suggest every limitation of the pending claims.

Claims 1, 4, 7, 10, 13, 14, 17, 23, 27-28, 30, 31

Claim 1 has been amended to clarify the separation between the pixel driver circuit and the constant current generators driving the display. By way of one specific example, the applicants respectfully refer to the Examiner to Fig. 8 of the disclosure, which illustrates an embodiment consistent with the amended claim 1. As shown in Fig. 8, the constant current generators driving the display (e.g., 840) may be functionally separate from the pixel driver circuit (e.g., 820).

The applicants respectfully submit that none of the cited references discloses adjustable constant current generators, much less a display driver in which a plurality of adjustable constant current generators interact with a pixel driver circuit in the manner recited in claim 1. The Office Action relies solely upon Kimura with respect to this element and, in particular, refers to the components 221, 223, 132, and 133 illustrated in Fig. 1. However, Kimura neither describes these components as constant current generators nor suggests, even generally, that these components may be constant current generators. Instead, Kimura describes a voltage-driven active matrix pixel (see Figure 1). By voltage-driven, it is meant that the voltage on the gate connection of the drive transistor sets the pixel brightness, rather than the brightness being set by an adjustable constant current.

Moreover, Kimura fails to disclose a pixel driver circuit including a field effect transistor, such that each of the plurality of adjustable constant current generators drives a row or column of a display with an adjustable constant current determining the voltage on the gate connection the pixel driver circuit, as recited by the amended claim 1. Similarly, Kimura fails to disclose the act of driving a row or column of a display via a plurality of adjustable constant current generators, as recited by the amended claim 17. None of the other cited references disclose these elements, either (nor does the Office Action cite

these references for this purpose). At least for this additional reason, the cited references fail to anticipate claims 1, 4, 7, 10, 13, 14, 17, 23, 27, 28, 30, and 31.

Further, the applicants respectfully submit that the Office Action does not identify a particular element in the cited art corresponding to a configuration of the power controller, recited in claims 1 and 17, to reduce "said power supply voltage in response to said sensed voltage to a point where a voltage of said adjustable voltage power supply is just sufficient for said adjustable constant current generator with a highest output current to be able to provide a highest said gate connection voltage, said highest gate connection voltage being determined by said highest output current in accordance with a compliance of said adjustable constant current generator wit said highest output current." The Office Action merely indicates that this configuration "is implicit" (*Id.* at page 4) or "would have been obvious" (*Id.* at page 7). In fact, the only recognition that this configuration may be advantageous comes from the applicants' disclosure, as none of Kimura, Hen, or Young discloses or suggests determining a voltage in accordance with a compliance of the adjustable constant current generator with the highest current, for example. Thus, the Office Action impermissibly relies on hindsight reasoning in proposing the correspondence of the elements of claims 1, 4, 7, 10, 13, 14, 17, 23, 27, 28, 30, and 31 to those of the cited reference. *See* M.P.E.P. §2142. At least for this additional reason, the Office Action failed to establish a prima facie case of obviousness.

Still further, the Office Action failed to establish a prima facie case of obviousness because there is no motivation in the cited art to use voltage reduction in combination with Kimura. On page 6, the Office Action acknowledges that Kimura does not explicitly teach reducing the supply voltage but suggests that it would be obvious to reduce the power supply voltage. In fact, Kimura explicitly teaches the opposite, namely increasing the drive to an OLED pixel to compensate for decreased efficiency of the OLED light output (e.g., col. 22, lines 30-39, in particular line 35). The Office Action then asserts "further, it is a goal of Kimura to provide "low power consumption"" (page 6). Yet if this indeed were the objective of Kimura, clearly it was not obvious to Kimura that this objective could be achieved by the arrangement recited by the pending claims because Kimura consistently teaches increasing the output voltage. Meanwhile, each of the pending claims recites elements or acts for reducing the power supply voltage.

Additionally, the applicants note that contrary to the assertion in the Office Action, Shen does not utilize "voltage adjustment that is generated through the use of a

correction current applied to a current-to-voltage converter" (page 5). In this regard, the Office Action apparently relies on element 43 shown in Fig. 3 and to a passage in Shen in column 7. However, these lines are for sensing a current, not sensing a voltage. Shen mentions voltage sensing elsewhere (element 94 in Fig. 9; the Abstract), but these teachings of Shen relate to compensating for long-term decay in the light output efficiency of a pixel of an OLED display. Kimura is concerned with the same problem of compensating for long-term decay in the light output efficiency of a pixel. Therefore, one of ordinary skill in the art would not be motivated to combine Shen with Kimura in the manner suggested in the Office Action. Furthermore, neither Kimura nor Shen recognized the advantages of voltage adjustment that is generated through the use of a correction current applied to a current-to-voltage converter.

Finally, the applicants respectfully point out that each of claims 1, 4, 7, 10, 13, 14, 17, 23, 27, 28, 30, and 31 is generally directed to a display driver using a plurality of adjustable constant current generators. Thus, a display driver consistent with each of these claims may be utilized in a (constant) current-driven display. Kimura, on the other hand, describes a voltage-driven display. These two types of display generally operate in different, mutually incompatible ways. For this additional reason, Kimura fails to suggest at least a plurality of adjustable constant current generators, as recited in each of the claims 1, 4, 7, 10, 13, 14, 17, 23, 27, 28, 30, and 31.

Claims 32-33

As amended, claim 32 recites, in part, a display driver for an active matrix electroluminescent display, in which each display element driver circuit includes a drive field effect transistor having a gate connection for driving the associated display element in accordance with a voltage on the gate connection and a capacitor coupled to said gate connection and a photodiode coupled across said capacitor to reduce said gate connection voltage in accordance with the brightness of the pixel. None of the cited references discloses or suggests this element.

Moreover, it is noted that the capacitors 222 in the pixel circuits of Kimura are intended to prevent decay of a voltage on the gate connection of the transistor 223. Nowhere does Kimura teach or suggest that a power supply voltage may be reduced in response to a sensed voltage such that the gate connection voltage of a brightest pixel has decayed sufficiently to switch the bright pixel off at the end of a driving cycle of the

display, as recited in claim 32. In connection with this element, the Office Action asserts that these features are implicit (page 19). However, it is respectfully submitted that the only motivation to implement this type of voltage reduction comes from the applicants' disclosure, and the rejection thus constitutes an improper use of hindsight reasoning. In particular, the display of Kimura (*see* figure 1) does not operate in a manner suitable for application of a method or apparatus consistent with the pending claims at least because the display of Kimura lacks a photodiode across the capacitor 222 to gradually decay the gate voltage according to the brightness of the pixel. For this additional reason, Kimura, alone or in any proper combination with Shen and/or Young, fails to disclose or suggest claims 32-33.

Additional remarks

The applicants respectfully submit that in rejecting claim 32, the Office Action asserts that element 223 of Kimura corresponds to a gate connection of a display element (*Office Action,* page 18), whereas the Office Action also relies on element 223 of Kimura as corresponding to the constant current generators of claims 1 or 17 (*Id.* at pages 3, 11). Clearly, both cannot be true.

In the view of the amendments and the foregoing discussion, the applicants submit that the rejections have been overcome and should be withdrawn.

CONCLUSION

Should the examiner wish to discuss the foregoing, or any matter of form or procedure in an effort to advance this application to allowance, he is urged to contact the undersigned attorney.

Respectfully submitted,

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